

# ISI Admission Test 2024

## Syllabus for M. Math. Programme

Test Codes: PMA (Forenoon) and PMB (Afternoon)

### 1. Analysis and metric spaces

- Countable and uncountable sets;
- Equivalence relations and partitions;
- Convergence and divergence of sequences and series;
- Cauchy sequence and completeness;
- Bolzano–Weierstrass theorem;
- Continuity, uniform continuity, differentiability, Taylor expansion;
- Sequences and series of functions;
- Elements of ordinary differential equations;
- Integral calculus of one variable–existence of Riemann integral;
- Fundamental theorem of calculus, change of variable, improper integrals;
- Elementary topological notions for metric spaces: open, closed and compact sets, continuous functions, completeness of metric spaces.

### 2. Linear algebra and abstract algebra

- Vector spaces, subspaces, basis, dimension, direct sum;
- Matrices, systems of linear equations, determinants;
- Diagonalization, triangular forms;
- Inner product spaces;
- Linear transformations and their representation as matrices;
- Groups, subgroups, quotient groups, homomorphisms, products;
- Lagrange’s theorem, Sylow’s theorems;
- Rings, ideals, maximal ideals, prime ideals, quotient rings;
- Integral domains, Chinese remainder theorem, polynomial rings, fields.

### 3. Elementary probability theory

- Combinatorial probability, events, random variables, independence, expectation and variance.